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Craniofacial Morphology in Children With Obesity or Down Syndrome With and Without Obstructive Sleep Apnea

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Introduction: Obstructive Sleep Apnea (OSA) is common in children and leads to significant morbidity if left untreated. Risk factors for childhood OSA include adenotonsillar hypertrophy, obesity, and genetic diseases associated with craniofacial abnormalities such as Down Syndrome (DS). Craniofacial characteristics have been suggested to contribute to OSA in children. The study aim was to describe the craniofacial morphology in children with suspected OSA referred for polysomnography (PSG) in 2 cohorts: DS and obese.

Methods: This was a cross-sectional study of children with DS or obesity referred for PSG at The Hospital for Sick Children in Toronto. An orthodontic exam, PSG, lateral cephalogram, and sleep questionnaires were completed.

Results: 42 children aged 5-18 (20 DS, 22 obese) participated. OSA was more prevalent in DS children (85%) than in obese children (63%). DS participants with OSA (Obstructive Apnea Hypopnea Index (OAHI) $\geq$ 1/hour) had increased palatal depth ($p = 0.011$) and OAHI score was correlated with incisor display at rest ($r = 0.450$, $p = 0.046$) and intercanine distance ($r = 0.528$, $p = 0.017$). Obese participants had OAHI scores that were correlated with gingival display on smile ($r = 0.860$, $p < 0.001$), ANB angle ($r = 0.532$, $p = 0.011$), and upper incisor position (U1-NA) ($r = -0.515$, $p = 0.014$).

Conclusions: OSA was more common and more severe in DS. OSA in DS children may be due to maxillary dimensions. Upper incisor retrusion and mandibular position may contribute to OSA in obese children.